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| EXAMINER | |
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| VILLENA, MARK | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/090,544 | JOHNSTON ET AL. | |
| | **Examiner** | **Art Unit** | |
| | MARK VILLENA | 2626 | |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --***

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *03/04/2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 March 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/04/2002*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Drawings*

1. The drawings submitted on 03/04/2002. These drawings are reviewed and accepted by the examiner.

### *Information Disclosure Statement*

2. The information disclosure statement (IDS) submitted on 03/04/2002 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### *Claim Objections*

3. Claim 17 is objected to because of the following informalities: the claim recites “The method of claim 17”. The Examiner believes the Inventor meant “The method of claim 16.” Appropriate correction is required.

### *Claim Rejections - 35 USC § 101*

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

**Claims 1-22** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding method **claim 1**, the claim is/are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent[1] and recent Federal Circuit decisions[2] indicate that a statutory “process” under 35 U.S.C. 101 must (1) be tied to another statutory

category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

In this case, the claimed method of ***"determining a representation of the envelope of the part of said x(t) that is inside a particular cochlea filter band", "quantifying a roughness measure for said envelope", and "mapping said roughness measure to a NMR for the part of the signal that is inside said particular cochlear filter band"*** are of sufficient breadth that it would be reasonably interpreted as a series of steps completely performed mentally, verbally or without a machine. For example, the claim language itself is sufficiently broad to read on merely using a paper and pencil with drawings and/or merely mentally stepping through the corresponding processes of determining Noise Masking Ratios, without any specific machine. Therefore, the claimed invention, as whole, is directed to non-statutory subject matter. (See "*Interim Examination Instructions For Evaluating Subject Matter Eligibility Under 35 USC 101*", effective on August 24, 2009).

In addition, the claimed method of ***"determining a representation of the envelope of the part of said x(t) that is inside a particular cochlea filter band", "quantifying a roughness measure for said envelope", and "mapping said roughness measure to a NMR for the part of the signal that***

***is inside said particular cochlear filter band"*** are of sufficient breadth that it would be reasonably interpreted as a series of steps that do not transform underlying subject matter, the subject matter being determining Noise Masking Ratios. Therefore, the claimed invention, as whole, is directed to non-statutory subject matter.

Furthermore, **claims 1-22** are also rejected under 35 USC 101 for the reason that the claim as a whole is drawn to or reasonably interpreted as a mathematical algorithm and/or pure data manipulation.

Regarding mathematical algorithms, the following is cited from the **MPEP, CH. 2106.02**:

*"Claims to processes that do nothing more than solve mathematical problems or manipulate abstract ideas or concepts are complex to analyze and are addressed herein. If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Gottschalk v. Benson, 409 U.S. 63, 71 - 72, 175 USPQ 673, 676 (1972). Thus, <u>a process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process</u>.*

*In practical terms, claims define nonstatutory processes if they consist solely of mathematical operations without some claimed practical application (i.e., executing a "mathematical algorithm")."*

In this case, the claimed method of ***"determining a representation of the envelope of the part of said x(t) that is inside a particular cochlea filter band"*** can be drawn to or broadly interpreted as a mathematical algorithm (abstract idea) without practical application in light of the specification (see PG. 4,

EQ. 1). Claiming the method of a mathematical algorithm per se is substantially drawn to an abstract idea without practical application, which falls within judicial exception. (See "*Interim Examination Instructions For Evaluating Subject Matter Eligibility Under 35 USC 101*", effective on August 24, 2009). Therefore, the claimed invention, as whole, is directed to non-statutory subject matter.

Regarding pure data manipulation, the following is cited from the **MPEP CH. 2106.01**:

*"Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific <u>data manipulation functions</u>." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).)"*

Furthermore, *"Data structures not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer."*

In this case, the claimed method of ***"determining a representation of the envelope of the part of said x(t) that is inside a particular cochlea filter band"*** can be drawn to or reasonably interpreted as data structure not embodied in a computer-readable medium. Claiming the method of pure data manipulation or data structure per se is substantially drawn to an abstract idea without practical application, which falls within judicial exception. (See "*Interim Examination Instructions For Evaluating Subject Matter Eligibility Under 35 USC*

*101"*, effective on August 24, 2009). Therefore, the claimed invention, as whole, is directed to non-statutory subject matter.

### *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. **Claims 1-6, 10-17** are rejected under 35 U.S.C. 103(a) as being unpatentable over **J. HERRE et al. (hereinafter referred to as HERRE) ("Enchancing the Performance of Perceptual Audio Coders by Using Temporal Noise Shaping (TNS)") in view of K. BRANDENBURG et al. (hereinafter referred to as BRANDENBURG) ("NMR" and "Masking Flag": Evaluation of Quality Using Perceptual Criteria).**

Regarding **claim 1**, **HERRE** discloses:

*"A perceptual model"* (in **PG. 1, INTRO**; 'Perceptual audio coders have been developed…' Perceptual audio coding comprises perceptual model.);

*"audio signals x(t) in each cochlea filter band"* (in **PG. 2, LAST PAR.**; The generic coder structure of a perceptual coder exploits the irrelevancy contained in each signal due to the limitations of the human auditory system (cochlear)) and (in **PG. 7, TOP**; FIG.9 shows the Hilbert envelopes for these bandpass signals, each of a width of 500 Hz, with center frequencies ranging from 1500 Hz to 4000 Hz.) and (in **PG. 2, LAST PAR.**; The perceptual audio coder is based on the human auditory system).

*"determining a representation of the envelope of the part of said x(t) that is inside a particular cochlea filter band"* (in **PG. 6, EQ.1**; EQ.1 shows a formula describing the Hilbert envelope, *e(t)*.);

*"quantifying a roughness measure for said envelope"* (in **PG. 6, EQ.2**; EQ.2 discloses a formula relating the power spectral density of a signal to its autocorrelation function, which describes the roughness measure for said envelope in light of the specification (see JOHNSTON, PG. 5, LINES 25-27));

*"mapping said roughness measure to a NMR for the part of the signal that is inside said particular cochlear filter band"* (in **PG. 2**; The spectral values are quantized (mapped) and coded according to the precision corresponding to the masked threshold estimate.).

However, **HERRE** does not expressly disclose *"determining Noise Masking Ratios."*

In the same field of endeavor (methods for perceptual coding), **BRANDENBURG** discloses *“determining Noise Masking Ratios”* (in **PG. 173, RIGHT COL.**; Disclosed is the computation of the Noise-to-Mask Ratio.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify **HERRE's** perceptual audio coder with **BRANDERNBURG’s** method of using noise masking ratios. In addition, **BRANDENBURG’s** advanced measurement techniques pertain modeling the human auditory system (see BRANDENBURG, PG. 172).

For the purpose of motivation and based on above teachings, one ordinarily skilled in the art would recognize that the combination would provide less computational complexity for the measurement technique as well as easy and accurate implementation. See BRANDENBURG, PG. 173, NMR and ‘masking flag’.

Regarding **claims 2 and 13 (dep. on claims 1 and 12 respectively)**, **HERRE (in view of BRANDENBURG)** discloses *“determining a representation of the envelope comprises determining e(t), the square of said envelope”* (**HERRE**, in **PG. 15, 4th EQUATION**; *e(t)* is equivalent to the square of the envelope.).

Regarding **claims 3 and 14 (dep. on claims 1 and 12 respectively)**, **HERRE (in view of BRANDENBURG)** discloses *“said determining a representation of said envelope comprises determining ~ (.function.), where X(.function.) is the Fourier transform of x(t), and ~ (.function.) is the Fourier transform of the analytic signal corresponding to x(t), ~ (.function.) being a single*

*sided frequency spectrum defined as [image] for .function. extending over a frequency range associated with a human cochlea"* (**HERRE**, in **PG. 15, 3rd EQUATION**; *C(f)* is equivalent to the one sided frequency spectrum, similar to what the instant application's claim recites.).

Regarding **claims 4 and 15 (dep. on claims 3 and 14 respectively)**, **HERRE (in view of BRANDENBURG)** discloses *"filtering said ~ (.function.) by a cochlear filter, H i (.function.), for i = 1, 2, ... N to form representations of said single-sided frequency spectrum for N discrete bands of said frequency range, said representations given by ~i(.function.)=~(.function.)H i(.function.)"* (**HERRE**, in **PG. 13, 4th BULLET PT.**; 'It is possible to use several filters operating on distinct frequency (coefficient) regions.' These frequency regions are the regions most pertaining to the human auditory system.).

Regarding **claims 5 and 16 (dep. on claims 4 and 15 respectively)**, **HERRE (in view of BRANDENBURG)** discloses *"said determining said envelope further comprises determining e i(t) for said N discrete bands in accordance with e i(t)=F-1{[integral]~i([epsilon]).~~([epsilon]-.function.)d[epsilon]} where e i(t) is the square of said signal envelope corresponding to the ith cochlea filter band having a characteristic frequency .function.i."* (**HERRE**, in **PG. 15**; The signal envelope is connected to the autocorrelation in the frequency domain. The *e(t)* disclosed by HERRE is similar to the *e i(t)* recited in the instant application's claim.).

Regarding **claims 6 and 17 (dep. on claims 5 and 16 respectively)**, **HERRE (in view of BRANDENBURG)** discloses *"said quantifying a roughness*

*measure for said envelope comprises performing a linear prediction of said envelope, e i(t) for each i to determine corresponding banded roughness measures r s(i)"* (**HERRE**, in **PG. 7, 2nd PAR.**; Linear predictive coding (LPC) is applied to signal in the frequency domain, which is the domain where the roughness of the envelope is measured.).

Regarding **claim 10 (dep. on claim 6)**, the claim recites *"said mapping said roughness measure for each cochlear band i to a NMR comprises determining [image] where r t(i) is the roughness measure for a pure tone for each i, and c is a constant."*

**HERRE (in view of BRANDENBURG and SMYTH)** discloses (**BRANDENBURG**, in **PG. 174, 'NMR, SEGNMR, masking flag'**; The local noise to masking ratio is equivalent to the log of the noise density (roughness measure) divided by the mask density.).

The idea of measurement manipulation (raising the roughness measure to another power) is based on the same or similar principle as taking the log of the ratio, as taught by BRANDENBURG. Therefore, raising the squared normalized roughness value to the 4th power would have been obvious to one of ordinary skill in the art at the time of the invention was made. Known work in one field of endeavor (taking the log of the density ratio) may prompt variations of it (raising roughness measure to another power) for use in other the same field (perceptual coding) based on design incentives since the variations are predictable to one of ordinary skill in the art.

Regarding **claim 11 (dep. on claim 10)**, **HERRE (in view of BRANDENBURG)** discloses *"said constant, c, is determined by performing a linear prediction of the envelope, e i(t) for each I"* (**HERRE**, in **PG. 7, 2nd PAR.**; Linear predictive coding (LPC) is applied to signal in the frequency domain, which is the domain where the roughness of the envelope is measured.);

*"for a white noise input signal"* (**BRANDENBURG**, in **PG. 169, FIG.1**; White noise, '13-dB miracle'.);

*"thereby determining corresponding banded roughness measures r n(i)"* (**BRANDENBURG**, in **PG. 172, NOISE LOUDNESS**; The power density spectract (roughness) is calculated for the noise signal.);

*"substituting said r n(i) values for r s(i) in [image]"* (**BRANDENBURG**, in **PG. 169, FIG.1**; White noise, '13-dB miracle'. Instead of an arbitrary signal as the input, the disclosed white noise will be inputted.);

*"substituting known theoretical values for NMR i for white noise in the immediately preceding equation, thereby determining a value, c i, for each I"* (**BRANDENBURG**, in **PG. 174, RIGHT**; NMR is equivalent to the noise density (roughness of the white noise) divided by the mask density (pure tone)) and (**BRANDENBURG**, in **PG. 172, KNOWN ADVANCED…**; 'All systems use the original signal to derive an estimated masking threshold (theoretical). This is then compared to the actual noise signal or the signal under test. A distortion measure is derived from the result of the comparison.' The Examiner interprets the *c* in the instant application as the disclosed distortion measure. There is a comparison performed between actual measurements and theoretical

measurements, similar to the instant application's substitution of theoretical NMR values in the equation in order to find *c*.);

*"averaging said values of c i for all i to determine said value for c"* (**BRANDENBURG**, in **PG. 174**; The mean NMR is calculated and defined by NMRSEG.).

Regarding **claim 12**, **HERRE** discloses:

*"A method for coding audio signals x(t) in the frequency domain"* (in **PG. 6**; Thus, the squared Hilbert envelope of a signal and power spectral density constitute dual aspects in time and frequency domain.);

*"for each band of a cochlear filter having a plurality of bands"* (in **PG. 13, LAST BULLET**; It is possible to use to use several filters operating on distinct frequency regions.);

*"determining a representation of the envelope of the part of said x(t) that is inside a particular cochlea filter band"* (in **PG. 6, EQ.1**; EQ.1 shows a formula describing the Hilbert envelope, *e(t)*.);

*"quantifying a roughness measure for said envelope"* (in **PG. 6, EQ.2**; EQ.2 discloses a formula relating the power spectral density of a signal to its autocorrelation function, which describes the roughness measure for said envelope in light of the specification (see JOHNSTON, PG. 5, LINES 25-27));

*"mapping said roughness measure to a Noise Masking Ratio, NMR, for the part of x(t) that is inside said particular cochlear filter band"* (in **PG. 2**; The spectral values are quantized (mapped) and coded according to the precision corresponding to the masked threshold estimate.).

*"quantizing said audio signals in the frequency domain using said NMRs to determine quantizing levels"* (in **PG. 2**; The spectral values are quantized (mapped) and coded according to the precision corresponding to the masked threshold estimate.).

However, **HERRE** does not expressly disclose *"determining Noise Masking Ratios."*

In the same field of endeavor (methods for perceptual coding), **BRANDENBURG** discloses *"determining Noise Masking Ratios"* (in **PG. 173, RIGHT COL.**; Disclosed is the computation of the Noise-to-Mask Ratio.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify **HERRE's** perceptual audio coder with **BRANDENBURG's** method of using noise masking ratios. In addition, **BRANDENBURG's** advanced measurement techniques pertain modeling the human auditory system (see BRANDENBURG, PG. 172).

8. **Claims 7-9 and 18-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over **HERRE (in view of BRANDENBURG)** as applied to claims 6 and 17 above, and further in view of **SMYTH (5,956,674)**.

Regarding **claims 7 and 18 (dep. on claims 6 and 7 respectively)**, **HERRE (in view of BRANDENBURG)** discloses *"said mapping said roughness measure to a NMR comprises normalizing said r s(i), for each i, to form a normalized roughness measure for each i"* (**HERRE**, in **FIG. 9 and PG. 7, TOP**; All envelopes are normalized in their maximum amplitudes. See FIG. 9 as well.).

However, **HERRE (in view of BRANDENBURG) does not** expressly disclose *"with respect to a roughness measure for a pure tone, r t(i), for each i, t."*

In the same field of endeavor (subband audio coder, see ABSTRACT), **SMYTH** discloses (in **COL. 24, LINES 33-37**; The prediction gain within each subband can be mapped to a set of tonality ratios such that a sine wave and white noise in any subband produce prediction gains that have tonality ratios of 1.0 and 0.0 respectively.).

**SMYTH** discloses mapping prediction gains (i.e., roughness measure, in light of specification, see instant application, PG. 8) for a sine wave (pure tone). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify **HERRE's (in view of BRANDENBURG)** signal roughness measure normalization in respect to a prediction gain (roughness measure) of a sine wave, as taught by **SMYTH**.

For the purpose of motivation and based on above teachings, one ordinarily skilled in the art would recognize that the combination provides a multi-channel audio coder with the flexibility to accommodate a wide range or compression levels and improved perceptual quality. See SMYTH, COL. 3, LINES 13-19.

Regarding **claims 8 and 19 (dep. on claims 7 and 18 respectively)**, **HERRE (in view of BRANDENBURG and SMYTH)** discloses *"said mapping said roughness measure to a NMR further comprises squaring said normalized roughness measure for each i to form a squared roughness measure for each I"* (**HERRE**, in **PG. 8, 4$^{th}$ PAR.**; Disclosed in this section is Temporal Noise Shaping

via Prediction in the Spectral Domain. 'A reduction of residual energy depends on the "squared-envelope flatness measure" of the signal.' The signal (in frequency domain) is squared.).

Regarding **claims 9 and 20 (dep. on claims 8 and 19 respectively)**, the claim recites *"said squared roughness measure is raised to the 4th power to reflect cochlea compression."* **HERRE (in view of BRANDENBURG and SMYTH)** discloses (**BRANDENBURG**, in **PG. 174, 'NMR, SEGNMR, masking flag'**; The local noise to masking ratio is equivalent to the log of the noise density (roughness measure) divided by the mask density.).

The idea of measurement manipulation (raising the roughness measure to another power) is based on the same or similar principle as taking the log of the ratio, as taught by BRANDENBURG. Therefore, raising the squared normalized roughness value to the $4^{th}$ power would have been obvious to one of ordinary skill in the art at the time of the invention was made. Known work in one field of endeavor (taking the log of the density ratio) may prompt variations of it (raising roughness measure to another power) for use in other the same field (perceptual coding) based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art.

Regarding **claim 21 (dep. on claim 19)**, the claim recites *"said mapping said roughness measure for each cochlear band i to a NMR comprises determining [image] where r t(i) is the roughness measure for a pure tone for each i, and c is a constant."*

**HERRE (in view of BRANDENBURG and SMYTH)** discloses (**BRANDENBURG**, in **PG. 174, 'NMR, SEGNMR, masking flag'**; The local noise to masking ratio is equivalent to the log of the noise density (roughness measure) divided by the mask density.).

The idea of measurement manipulation (raising the roughness measure to another power) is based on the same or similar principle as taking the log of the ratio, as taught by BRANDENBURG. Therefore, raising the squared normalized roughness value to the $4^{th}$ power would have been obvious to one of ordinary skill in the art at the time of the invention was made. Known work in one field of endeavor (taking the log of the density ratio) may prompt variations of it (raising roughness measure to another power) for use in other the same field (perceptual coding) based on design incentives since the variations are predictable to one of ordinary skill in the art.

Regarding **claim 22 (dep. on claim 21)**, **HERRE (in view of BRANDENBURG and SMYTH)** discloses *"said constant, c, is determined by performing a linear prediction of the envelope, e i(t) for each I"* (**HERRE**, in **PG. 7, $2^{nd}$ PAR.**; Linear predictive coding (LPC) is applied to signal in the frequency domain, which is the domain where the roughness of the envelope is measured.);

*"for a white noise input signal"* (**BRANDENBURG**, in **PG. 169, FIG.1**; White noise, '13-dB miracle'.);

*"thereby determining corresponding banded roughness measures r n(i)"* (**BRANDENBURG**, in **PG. 172, NOISE LOUDNESS**; The power density spectra (roughness) is calculated for the noise signal.);

*"substituting said r n(i) values for r s(i) in [image]"* (**BRANDENBURG**, in **PG. 169, FIG.1**; White noise, '13-dB miracle'. Instead of an arbitrary signal as the input, the disclosed white noise will be inputted.);

*"substituting known theoretical values for NMR i for white noise in the immediately preceding equation, thereby determining a value, c i, for each I"* (**BRANDENBURG**, in **PG. 174, RIGHT**; NMR is equivalent to the noise density (roughness of the white noise) divided by the mask density (pure tone)) and (**BRANDENBURG**, in **PG. 172, KNOWN ADVANCED…**; 'All systems use the original signal to derive an estimated masking threshold (theoretical). This is then compared to the actual noise signal or the signal under test. A distortion measure is derived from the result of the comparison.' The Examiner interprets the *c* in the instant application as the disclosed distortion measure. There is a comparison performed between actual measurements and theoretical measurements, similar to the instant application's substitution of theoretical NMR values in the equation in order to find *c*.);

*"averaging said values of c i for all i to determine said value for c"* (**BRANDENBURG**, in **PG. 174**; The mean NMR is calculated and defined by NMRSEG.).

## *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARK VILLENA whose telephone number is

(571) 270-3191. The examiner can normally be reached on M - Th 7:30 - 5, F 7:30 - 4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, RICHEMOND DORVIL can be reached on (571) 272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MARK VILLENA
Examiner
Art Unit 2626

/ QI HAN/
Primary Examiner, Art Unit 2626